

Chapter 20A

Lightweight Metals

Comparison Summary

Chapter 20 in the *IBC* and Chapter 42 of *NFPA 5000*, cover the design of aluminum structures.

IBC 2003

IBC contains a general scope statement (Ch 20 covers aluminum design and construction), and references current Aluminum Association material design and construction standards for both ASD and LRFD. *IBC* text does not contain any design or construction provisions within the code text (as the 2001 *CBC* does).

NFPA 5000

NFPA 5000 Sec. 42.1 specifies, "Aluminum construction shall be designed and constructed in accordance with approved standards." Per the Chapter 3 definition, "approved" refers to approval by the AHJ (OSHPD). Chapter 2 (referenced publications) lists the Aluminum Association Standard AA SAS 30, Aluminum Construction Manual Series, Section I, Specifications for Aluminum Structures, 1986. This publication is referenced in Sec. 35.1.2.8.5 of *NFPA 5000*, and is referenced for the purpose of deflection limitations.

Summary

Both model codes rely entirely on referenced standards.

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2001 CBC – Chapter 20A	IBC – Chapter 20	Comments
Division I - General 2001A – Material Standards and Symbols A.1 General A.2 Alloys A.3 Symbols and Notations A.4 Identification	2001 – General 2002 – Materials Referenced Standards: Aluminum Association (AA) - ASM 35-80 (Aluminum Sheet Metal Work in Building Construction) AA - Aluminum Design Manual (ADM 1-00); Part 1-A (ASD) and Part 1-B (LRFD)	<p>IBC contains a general scope statement (Ch 20 covers aluminum design and construction), and references current Aluminum Association material and design & construction standards for both ASD and LRFD.</p> <p>IBC text does not contain any design or construction provisions within the code text (as the 2001 CBC does).</p> <p>Review referenced standards to verify that standards address the scope of design and construction currently addressed by the 2001 CBC, and utilize current standards.</p>
2002A – Allowable Stresses for Members and Fasteners A.1 Allowable Unit Stresses A.2 Welded Structural Members A.3 Rivets and Bolts A.4 Fillet Welds	-	See comment above
2003A – Design A.1 Combined Stresses A.2 Light Gage Members A.3 Structural Roofing and Siding A.4 Connections	-	See comment above
2204A – Fabrication and Erection A.1 Cutting A.2 Fasteners A.3 Dissimilar Materials A.4 Painting A.5 Welding A.6 Welder Qualification A.7 Erection A.8 <i>Inspection of Welding</i>	-	<p>See comment above</p> <p>Evaluate continuation of OSHPD amendment A.8</p>
Table 20A-I-A Allowable Stresses for Rivets	-	See comment above
Table 20A-I-B Allowable Shear Stresses in Fillet Welds	-	See comment above
Table 20A-I-C General Formulas for Determining Allowable Stresses	-	See comment above

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2001 CBC – Chapter 20A	IBC – Chapter 20	Comments
Table 20A-I-D Factors of Safety for Use with Aluminum Allowable Stress Specifications	-	See comment above
Table 20A-I-E Formulas for Buckling Constants	-	See comment above
Table 20A-I-F Values of Coefficients	-	See comment above
Table 20A-I-G Formulas for Buckling Constants	-	See comment above
Division II – Design Standard for Aluminum Structures 2005A – Scope	Referenced Standards: Aluminum Association (AA) – ASM 35-80 (Aluminum Sheet Metal Work in Building Construction) AA – Aluminum Design Manual (ADM 1-00); Part 1-A (ASD) and Part 1-B (LRFD)	CBC provisions based on Specifications for Aluminum Structures of the Aluminum Association (December, 1986) IBC references current Aluminum Association material and design & construction standards for both ASD and LRFD. Review referenced standards to verify that standards address the scope of design and construction currently addressed by the 2001 CBC, and utilize current standards.
2006A – Materials	-	See comment above
2007A – Design	-	See comment above
2008A – Allowable Stresses (references Div. I)	-	See comment above
2009A – Special Design Rules A.1 Combined Compression and Bending A.2 Torsion and Shear in Tubes A.3 Combined Shear, Compression and Bending A.4 Stiffeners for Outstanding Flanges A.5 Horizontal Stiffeners for Shear Webs A.6 Vertical Stiffeners for Shear Webs A.7 Special Provisions for Thin Sections A.8 Fatigue A.9 Compression in Single-web Beams A.10 Compression in Elastically Supported Flanges	-	See comment above

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2001 CBC – Chapter 20A	IBC – Chapter 20	Comments
2210A – Mechanical Connections A.1 Riveted and Bolted Connections A.2 Thread Forming Screws and Metal Stitching Staples A.3 Fasteners for Structural Formed Sheet Roofing and Siding	-	See comment above
2211A – Fabrication A.1 Laying Out A.2 Cutting A.3 Heating A.4 Punching, Drilling and Reaming A.5 Riveting A.6 Painting A.7 Cleaning and Treatment of Metal Surfaces	-	See comment above
2012A – Welded Construction A.1 Filler Wire A.2 Columns and Single-web Beams... A.3 Welding Fabrication	-	See comment above
2013A – Testing A.1 General A.2 Test Loading and Behavior	-	See comment above
Table 20A-II-A Minimum Mechanical Properties for Aluminum Alloys	-	See comment above
Table 20A-II-B Minimum Mechanical Properties for Welded Aluminum Alloys	-	See comment above

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2001 CBC – Chapter 20A	NFPA 5000 – Chapter 42	Comments
Division I - General 2001A – Material Standards and Symbols A.1 General A.2 Alloys A.3 Symbols and Notations A.4 Identification	42.1 General	<p>NFPA 5000 Sec. 42.1 specifies that “aluminum construction shall be designed and constructed in accordance with approved standards.” Per chapter 3 definition, approved refers to approval by the AHJ (OSHDP).</p> <p>Chapter 2 (referenced publications) lists the Aluminum Association standard AA SAS 30, <i>Aluminum Construction Manual Series, Section I, Specifications for Aluminum Structures</i>, 1986. This publication is referenced in Sec. 35.1.2.8.5 of <i>NFPA 5000</i>, and is referenced for the purpose of deflection limitations.</p> <p>Adopt (by amendment) current AA standards pertaining to materials, design and construction.</p> <p>Review the (adopted) referenced standards to verify that standards address the scope of design and construction currently addressed by the 2001 CBC.</p>
2002A – Allowable Stresses for Members and Fasteners A.1 Allowable Unit Stresses A.2 Welded Structural Members A.3 Rivets and Bolts A.4 Fillet Welds	-	See comments above.
2003A – Design A.1 Combined Stresses A.2 Light Gage Members A.3 Structural Roofing and Siding A.4 Connections	-	See comments above.
2204A – Fabrication and Erection A.1 Cutting A.2 Fasteners A.3 Dissimilar Materials A.4 Painting A.5 Welding A.6 Welder Qualification A.7 Erection A.8 <i>Inspection of Welding</i>	-	See comments above.
Table 20A-I-A Allowable Stresses for Rivets	-	See comments above.

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2001 CBC – Chapter 20A	NFPA 5000 – Chapter 42	Comments
Table 20A-I-B Allowable Shear Stresses in Fillet Welds	-	See comments above.
Table 20A-I-C General Formulas for Determining Allowable Stresses	-	See comments above.
Table 20A-I-D Factors of Safety for Use with Aluminum Allowable Stress Specifications	-	See comments above.
Table 20A-I-E Formulas for Buckling Constants	-	See comments above.
Table 20A-I-F Values of Coefficients	-	See comments above.
Table 20A-I-G Formulas for Buckling Constants	-	See comments above.
Division II – Design Standard for Aluminum Structures 2005A – Scope	42.1 General	<p>CBC provisions based on Specifications for Aluminum Structures of the Aluminum Association (December, 1986)</p> <p>NFPA 5000 Sec. 42.1 specifies that “aluminum construction shall be designed and constructed in accordance with approved standards.” Per chapter 3 definition, approved refers to approval by the AHJ (OSHPD).</p> <p>Chapter 2 (referenced publications) lists the Aluminum Association standard AA SAS 30, <i>Aluminum Construction Manual Series, Section I, Specifications for Aluminum Structures</i>, 1986. This publication is referenced in Sec. 35.1.2.8.5 of <i>NFPA 5000</i>, and is referenced for the purpose of deflection limitations.</p> <p>OSHPD will adopt (by amendment) current AA standards pertaining to materials, design and construction.</p>
2006A – Materials	-	See comments above.
2007A – Design	-	See comments above.
2008A – Allowable Stresses (references Div. I)	-	See comments above.

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2001 CBC – Chapter 20A	NFPA 5000 – Chapter 42	Comments
2009A – Special Design Rules A.1 Combined Compression and Bending A.2 Torsion and Shear in Tubes A.3 Combined Shear, Compression and Bending A.4 Stiffeners for Outstanding Flanges A.5 Horizontal Stiffeners for Shear Webs A.6 Vertical Stiffeners for Shear Webs A.7 Special Provisions for Thin Sections A.8 Fatigue A.9 Compression in Single-web Beams A.10 Compression in Elastically Supported Flanges	-	See comments above.
2210A – Mechanical Connections A.1 Riveted and Bolted Connections A.2 Thread Forming Screws and Metal Stitching Staples A.3 Fasteners for Structural Formed Sheet Roofing and Siding	-	See comments above.
2211A – Fabrication A.1 Laying Out A.2 Cutting A.3 Heating A.4 Punching, Drilling and Reaming A.5 Riveting A.6 Painting A.7 Cleaning and Treatment of Metal Surfaces	-	See comments above.
2012A – Welded Construction A.1 Filler Wire A.2 Columns and Single-web Beams... A.3 Welding Fabrication	-	See comments above.

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2001 CBC – Chapter 20A	NFPA 5000 – Chapter 42	Comments
2013A – Testing A.1 General A.2 Test Loading and Behavior	-	See comments above.
Table 20A-II-A Minimum Mechanical Properties for Aluminum Alloys	-	See comments above.
Table 20A-II-B Minimum Mechanical Properties for Welded Aluminum Alloys	-	See comments above.